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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,622	12/30/2003	Steven H. Barss	09991-147001	8274

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EXAMINER	
LEBRON, JANNELLE M	

ART UNIT	PAPER NUMBER
2861	

DATE MAILED: 05/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/749,622	BARSS ET AL.	
	Examiner	Art Unit	
	Jannelle M. Lebron	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18,33-35 and 37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18,33-35 and 37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 May 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/1/04, 2/13/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 2 is objected to because of the following informalities: the limitation "forming the meniscus by controlling the pressure at the meniscus" is unclear. It has been assumed the limitation is "forming the meniscus by controlling the pressure at the fluid" for purposes of this examination. Appropriate correction is required.

2. Claim 5 is objected to because of the following informalities: the claim recites the limitation "wherein the vacuum at the nozzle opening" in line 1. There is insufficient antecedent basis for this limitation in the claim. For purposes of this examination, the claim has been taken as depending on claim 4. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 6-14, 16-18, 34, 35 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agarwal et al. (US 6,254,219) in view of Moriyama et al. (US 5,745,129).

Agarwal et al. disclose a method of fluid drop ejection, comprising:

- Claim 1:

providing a printhead including a fluid flow path [301 in fig. 3] in which fluid is pressurized to eject drops from a nozzle opening [209 in fig.13], the nozzle opening being disposed in a well [as seen in fig.1], supplying fluid to the well from the nozzle opening to form a meniscus [col.5, lines 18-21].

- Claim 10:

wherein the nozzle opening and the well are defined by a common body (as seen in figure 2).

- Claim 37:

wherein the well is oval (as seen in figure 6B).

Thus, Agarwal et al. teach the claimed limitations except "the meniscus defining a fluid depth above the edge of the nozzle opening equal to about 1 to 15% of the nozzle opening width with the well filled with fluid."

Moriyama et al. disclose an inkjet head having discharge openings driven by applying energy to ink paths corresponding to selected discharge openings (having a diameter of 25 microns) in a given group, wherein a meniscus having a depth of about two microns (less than 15% of the nozzle width) is formed after ink has been ejected.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Agarwal et al. invention to include means for maintaining a meniscus depth equal to 1-15% of the nozzle width as taught by Moriyama et al. for the purpose of controlling ink ejection.

- Claim 6:

Agarwal et al. in view of Moriyama et al. teach the claimed limitations except for "wherein the ratio of the well width to the nozzle opening width is about 1.4 to about 2.8." It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the ratio of the well width to the nozzle opening width be about 1.4 to about 2.8 for the purpose of utilizing an optimum range. The applicant should note that it has been held that where the general working conditions of a claim of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

- Claim 7:

Agarwal et al. in view of Moriyama et al. teach the claimed limitations except for "wherein the well has a depth of about 0.15 to 0.5 of the nozzle opening." It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the depth of the well be about 0.15 to 0.5 of the nozzle opening for the purpose of utilizing an optimum range. The applicant should note that it has been held that where the general working conditions of a claim of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

- Claim 8:

Agarwal et al. in view of Moriyama et al. teach the claimed limitations except for "wherein the spacing between well perimeter and nozzle perimeter is about 0.2 or more of the nozzle width." It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the make the spacing between well perimeter and nozzle perimeter be about 0.2 or more of the nozzle width since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215* (CCPA 1980).

- Claim 9:

Agarwal et al. in view of Moriyama et al. teach the claimed limitations except for "wherein the fluid has a surface tension of about 20-45 dynes/cm." It would have been obvious to one of ordinary skill in the art at the time the invention was made to include means to maintain the fluid having a surface tension of about 20-45 dynes/cm for the purpose of utilizing an optimum range. The applicant should note that it has been held that where the general working conditions of a claim of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

- Claim 11-14:

Agarwal et al. in view of Moriyama et al. teach the claimed limitations except for "wherein the nozzle opening and the well are defined in silicon material (claim 11)", "wherein the nozzle opening and the well are defined in a metal (claim 12)", "wherein the nozzle opening and the well are defined in carbon (claim 13)", and "wherein the

nozzle opening and the well are defined in a plastic (claim 14)." It would have been obvious to one having ordinary skill in the art at the time of the invention was made to utilize silicon material, metal, plastic, or carbon, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability in order to minimize costs and expedite design. *In re Leshin, 125, USPQ 416.*

- Claim 16:

Agarwal et al. in view of Moriyama et al. teach the claimed limitations except for "wherein the nozzle opening width is about 70 micron or less." It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the nozzle opening width be about 70 micron or less since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215* (CCPA 1980).

- Claim 17:

Agarwal et al. in view of Moriyama et al. teach the claimed limitations except for "the nozzle openings having a pitch of about 25 nozzles/inch or more." It would have been obvious to one of ordinary skill in the art at the time the invention was made to make nozzle openings having a pitch of about 25 nozzles/inch or more since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215* (CCPA 1980).

- Claim 18:

Agarwal et al. in view of Moriyama et al. teach the claimed limitations except for "ejecting drops having a volume of about 1 to about 70 pL." It would have been obvious

to one of ordinary skill in the art at the time the invention was made to include means for ejecting drops having a volume of about 1 to about 70 pL for the purpose of utilizing an optimum range. The applicant should note that it has been held that where the general working conditions of a claim of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

- Claim 34:

Agarwal et al. in view of Moriyama et al. teach the claimed limitations except for "wherein the nozzle opening width is about 70 micron or less." It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the nozzle opening width be about 70 micron or less since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215* (CCPA 1980).

- Claim 35:

Agarwal et al. in view of Moriyama et al. teach the claimed limitations except for "the nozzle openings having a pitch of about 100 nozzles/inch or more." It would have been obvious to one of ordinary skill in the art at the time the invention was made to make nozzle openings having a pitch of about 100 nozzles/inch or more since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215* (CCPA 1980).

5. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agarwal et al. (US 6,254,219) in view of Moriyama et al. (US 5,745,129) and further in view of Mackay et al. (US 6,139,136).

Agarwal et al. in view of Moriyama et al. teach the claimed limitations except "forming the meniscus by controlling the pressure in the fluid (claim 2)", comprising forming the meniscus by reducing the pressure in the fluid (claim 3)"

Mackay et al. disclose "the use of hydrostatic pressure control means at the nozzles of ink jet heads has been utilizes to effectively maintain an ink meniscus in each nozzle [col.1, lines 6-8]" and "the desired pressure range at each printhead should be maintained between approximately –10 to –40 millimeters of water pressure [col.3, lines 45-48]." Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Agarwal et al. invention in view of Moriyama et al. to include means for a controlling the fluid pressure at the meniscus as taught by Mackay et al. for the purpose of maintaining the ink meniscus at each nozzle.

6. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agarwal et al. (US 6,254,219) in view of Moriyama et al. (US 5,745,129) and further in view of Wouters (US 6,957,882).

Agarwal et al. in view of Moriyama et al. teach the claimed limitations except "comprising applying a vacuum at a location upstream of the nozzle opening (claim 4)" and "wherein the vacuum at the nozzle opening is about 0.5 to 10 inwg (claim 5)."

Wouters discloses a vacuum inlet (9 in figs. 3A-3B) on top of the ink chamber (7 in fig.3A-3B) that extracts air from the top of the ink chamber [column 4, lines 14-25].

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Agarwal in view of Moriyama invention to include means for applying a vacuum at a location upstream of the nozzles as taught by Wouters for the purpose of keeping a stable negative pressure in the chamber and compensate the positive hydrostatic pressure due to gravity.

Also, it would have been obvious to one of ordinary skill in the art at the time the invention was made to control the vacuum at the nozzle opening to be about 0.5 to 10 inwg for the purpose of utilizing an optimum range. The applicant should note that it has been held that where the general working conditions of a claim of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

7. Claims 15 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agarwal et al. (US 6,254,219) in view of Moriyama et al. (US 5,745,129) and further in view of Kazama et al. (US 6,511,156).

Agarwal et al. in view of Moriyama et al. teach the claimed limitations as set forth above regarding claims 1 and 18 except "wherein the fluid is pressurized by a piezoelectric element."

Kazama et al. disclose an inkjet head having a piezoelectric element [2 in fig. 1] that expands when exposed to a voltage and lifts up an oscillation plate [4 in fig.1] arranged in a neighboring manner. As the plate is lifted up, the volume of the ink chamber [9 in fig.1] contracts (receives the pressure wave). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the

Agarwal et al. in view of Moriyama et al. invention to include a piezoelectric element to pressurize the fluid in the ink channel as taught by Kazama et al. for the purpose of controlling ink ejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jannelle M. Lebron whose telephone number is (571) 272-2729. The examiner can normally be reached on Monday thru Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JML
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05/14/06